Insular glioma surgery

Approaches

Insular glioma surgery approaches.

Shawn Hervey-Jumper and Berger from the UCSF Medical Center reviewed the literature for published reports focused on insular region anatomy, neurophysiology, surgical approaches, and outcomes for adults with who grade II-IV gliomas.

While originally considered to pose too great a risk, insular glioma surgery can be performed safely due to the collective efforts of many individuals. Similar to resection of gliomas located within other cortical regions, maximal resection of gliomas within the insula offers patients greater survival time and superior seizure control for both newly diagnosed and recurrent tumors in this region. The identification and the preservation of M2 perforating and lateral lenticulostriate artery are critical steps to preventing internal capsule stroke and hemiparesis. The transcortical approach and intraoperative mapping are useful tools to maximize safety.

The insula's proximity to middle cerebral and lenticulostriate arteries, primary motor areas, and perisylvian language areas makes accessing and resecting gliomas in this region challenging. Maximal safe resection of insular gliomas not only is possible but also is associated with excellent outcomes and should be considered for all patients with low- and high-grade gliomas in this area.

Advances in microsurgical anatomy and brain mapping techniques have allowed an increase in the extent of resection with acceptable morbidity rates. Transsylvian and transcortical approaches constitute the main surgical corridors, the latter providing considerable advantages and a high degree of reliability. Nevertheless, both surgical corridors yield remarkable difficulties in reaching the most posterior insular region.
Small deep infarcts constitute a well-known risk of motor and speech deficit in insulo-opercular glioma surgery. However, the risk of cognitive deterioration in relation to stroke occurrence in so-called silent areas is poorly known.

In a paper, Loit et al. propose to build a distribution map of small deep infarcts in glioma surgery, and to analyze patients' cognitive outcome in relation to stroke occurrence.

They retrospectively studied a consecutive series of patients operated on for a diffuse glioma between June 2011 and June 2017. Patients with lower-grade glioma were cognitively assessed, both before and 4 months after surgery. Areas of decreased apparent diffusion coefficient (ADC) on the immediate postoperative MRI were segmented. All images were registered in the MNI reference by ANTS algorithm, allowing to build a distribution map of the strokes. Stroke occurrence was correlated with the postoperative changes in semantic fluency score in the lower-grade glioma cohort.

One hundred fifteen patients were included. Areas of reduced ADC were observed in 27 out of 54 (50%) patients with a lower-grade glioma, and 25 out of 61 (41%) patients with a glioblastoma. Median volume was 1.6 cc. The distribution map revealed five clusters of deep strokes, corresponding respectively to callosal, prefrontal, insulo-opercular, parietal, and temporal tumor locations. No motor nor speech long-term deficits were caused by these strokes. Cognitive evaluations at 4 months showed that the presence of small infarcts correlated with a slight decrease of semantic fluency scores.

Deep small infarcts are commonly found after glioma surgery, but their actual impact in terms of patients' quality of life remains to be demonstrated. Further studies are needed to better evaluate the cognitive consequences—if any—for each of the described hotspots and to identify risk factors other than the surgery-induced damage of microvessels 2).

Videos

Awake Brain Mapping in Dominant Side Insular Glioma Surgery: 2-Dimensional Operative Video 3).

Complications

Insular glioma surgery complications

References


2) Loit MP, Rheault F, Gayat E, Poisson I, Froelich S, Zhi N, Velut S, Mandonnet E. Hotspots of small